REMARKS

I. Interview

The Applicants have amended the application as indicated herein in accordance with proposals submitted to the Examiner in a telephone interview conducted at 10.00 AM on August 3, 2005. In particular, the independent claims 1, 14 & 15 have been amended to limit the claims to a plurality of compensating resistors and to reflect the fact that the plurality of compensating resistors includes one temperature independent resistor for compensating the temperature coefficient of resistance of the heating element(s).

The Examiner acknowledged that Davey et al. (US Patent No, 5,161,410) does not disclose a compensating resistor which is temperature independent for compensating the temperature coefficient of resistance of the heating element(s).

Furthermore, the Examiner accepted the Applicant's submissions and proposed amendments for traversing the rejection to claims 1-20 under 35 U.S.C 112, first paragraph, as failing to comply with the written description requirement and the enablement requirement, as will be described in more detail hereinafter.

II. Informalities

Regarding the Examiner's objection to claim 1 because the claim lacks antecedent basis, for reasons that will be explained hereinafter, claim 1 has been amended to recite "dynamically compensating for....a temperature of said plurality of resistors and.....". Consequently, it is believed that this amendment provides the claim with antecedent basis and removes the objection to claim 1.

III. Claim Rejections Under 35 U.S.C. §112

Written Description Requirement

Claims 1-20 were rejected under 35 U.S.C §102 first paragraph, as failing to comply with the written description requirement.

The Examiner argued that independent claims 1, 14, 15 each contain limitations for dynamically compensating for a temperature dependence of a plurality of components of the bridge circuit using a compensating resistor but that the specification does not discuss using a compensating resistor for compensation of the temperature coefficient of resistance (TCR) or the temperature dependence of a plurality of components of the bridge circuit.

The Applicants respectfully submit that the claims as originally filed disclose dynamically compensating for a temperature dependence of a plurality of resistors and at least one heating element of the bridge circuit (see for example the embodiment of FIG. 2 and the corresponding description set forth in paragraph 29). The skilled man would understand from reading the description in conjunction with the claims that compensating temperature dependence of a plurality of resistors and at least one heating element of the bridge circuit was in possession of the invention as claimed.

Accordingly, independent claims 1, 14 and 15 have been amended to recite "dynamically compensating .....the temperature dependence of a plurality of resistors and at least one heating element" and reference to " ...a temperature coefficient of resistance of a plurality of components..." has been deleted in order to remove this rejection to claims 1, 14 and 15 and to claims 2-13 and 16-20 by virtue of their dependency on claims 1 and 15.

The Applicants respectfully submit that the rejection to Claims 1-20 under 35 U.S.C §102 first paragraph, as failing to comply with the written description requirement, have been traversed. Accordingly, the Applicants request that the rejection to Claims 1-20 be withdrawn.

Enablement Requirement

Claims 1-20 were rejected under 35 U.S.C §102 first paragraph, as failing to comply with the enablement requirement.

The Examiner argued that independent claims 1, 14, 15 each contain limitations for dynamically compensating for a temperature dependence of a plurality of components of the bridge circuit using a compensating resistor but that the specification does not discuss using a compensating resistor for compensation of the temperature coefficient of resistance (TCR) or the temperature dependence of a plurality of components of the bridge circuit.

The skilled man would understand from reading the description in conjunction with the claims as originally filed that the embodiments teach " dynamically compensating the temperature dependence of at least one heating element and a plurality of resistors" as shown, for example in FIG. 2 of the application and the corresponding description set forth in paragraph 29 of the specification. This teaching clearly enables the skilled person to dynamically compensate for a temperature dependence of at least one heating element and a plurality or resistors. Accordingly, independent claims 1, 14 and 15 have been amended to recite "dynamically compensating .....the temperature dependence of a plurality of resistors and at least one heating element" in order to remove this rejection to claims 1, 14 and 15 and to claims 2-13 and 16-20 by virtue of their dependency on claims 1 and 15.

An additional rejection to Claim 9 was made under 35 U.S.C §102 first paragraph, as failing to comply with the written description requirement.

In order to overcome this rejection, claim 9 has been deleted.

The Applicants respectfully submit that the rejections to Claims 1-20 under 35 U.S.C §102 first paragraph, as failing to comply with the enablement requirement, have been traversed. Accordingly, the Applicants request that the rejection to Claims 1-20 be withdrawn.

IV. Claim Rejections Under 35 U.S.C. §102

Prima Facie Anticipation Under 35 U.S.C. § 102

A general definition of *prima facie* unpatentability under 35 U.S.C. § 102 is provided at 37 C.F.R. §1.56(b)(2)(ii):

> A *prima facie* case of unpatentability is established when the information *compels a conclusion* that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability. (*emphasis added*)

"Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration." *W.L. Gore & Associates v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983) (citing *Soundscriber Corp. v. United States*, 360 F.2d 954, 960, 148 USPQ 298, 301 (Ct. Cl.), *adopted*, 149 USPQ 640 (Ct. Cl. 1966)), *cert. denied*, 469 U.S. 851 (1984). Thus, to anticipate the Applicants' claims, the reference(s) cited by the Examiner must disclose each element recited therein. "There must be no difference between the claimed

invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention." *Scripps Clinic & Research Foundation v. Genentech, Inc.*, 927 F.2d 1565, 18 USPQ 2d 1001, 1010 (Fed. Cir. 1991).

To overcome the anticipation rejection, the Applicants need only demonstrate that not all elements of a *prima facie* case of anticipation have been met, *i. e.*, show that the reference cited by the Examiner fails to disclose every element in each of the Applicants' claims. "If the examination at the initial state does not produce a prima face case of unpatentability, then without more the Applicant is entitled to grant of the patent." *In re Oetiker*, 977 F.2d 1443, 24 USPQ 2d 1443, 1444 (Fed. Cir. 1992).

Davey et al.

Claims 1, 2, 4, 7, 8, 10, 11, 15, 16, and 18 were rejected under 35 U.S.C. 102(b) as being anticipated by Davey et al. (U.S. Patent No. 5,161,410).

The Examiner argued with regard to locating a bridge circuit on a physical property sensor substrate where the bridge circuit includes a heating element, a plurality of resistors and at least one compensating resistor, as shown in claims 1 and 15, that Davey et al. teaches a mass flow sensor circuit on a substrate that includes resistors, a heating element and a sensor that compensates the heating element. In support of this argument, the Examiner cited col. 5, lines 6-17; col. 8, lines 16-42; Fig. 1, Fig. 3, resistors 102, 104, heating element 16, sensor 100 of Davey et al.

The Applicants respectfully disagrees with this assessment. The Applicants reiterate the arguments related to this rejection as set forth in the Applicant's response to the first Office Action dated November 16, 2004. Applicants' claim 1 teaches the step of locating a bridge circuit on a physical property sensor substrate

wherein the bridge circuit comprises a plurality of components, including at least one (i.e., one or more) heating element and a plurality of resistors, including at least one compensating resistor for compensating a temperature coefficient of resistance of the one or more of the heating elements and a temperature coefficient of resistance of the plurality of components and a temperature dependence of a physical property thereof. Applicants note that resistors 102, 104 and/or sensor 100 of Davey et al. cited by the Examiner do not provide for the compensation of all three factors claimed by Applicants' invention --- that is, compensating a temperature coefficient of resistance of the at least one heating element and a temperature coefficient of resistance of the plurality of components and a temperature dependence of a physical property thereof.

Neither col. 5, lines 6-17; col. 8, lines 16-42; Fig. 1, Fig. 3, resistors 102, 104, heating element 16, sensor 100 of Davey et al. cited by the Examiner teach all three compensation factors taught by Applicants' claim 1. In fact, the Applicants notes that the temperature dependence of the fluid property is not even mentioned by Davey et al. The Examiner has not provided evidence to the contrary but has instead merely cited portions of Davey et al. without a substantial explanation of how such cited sections and features of Davey et al. disclose all of the limitations of Applicants' claim 1. The Applicants reminds the Examiner that the reference should not be taken out of context to in effect produced the words of the claims (and sometimes, not even the words or concepts of the claims), without their meaning or context.

With regard to dynamically compensating for a temperature coefficient of resistance of the thin-film heating material, temperature dependence of the components on the bridge and temperature dependence of the physical property sensor, as shown in claims 1 and 15, the Examiner argued that Davey et al. teaches balancing the heating element bridge circuit to compensate for changes in the

ambient temperature which affect all components of the circuit. In support of this argument, the Examiner cited col. 8, line 16 – col. 9, line 20 of Davey et al.

The Applicants respectfully disagree with this assessment. The Applicants reiterate the associated arguments as set forth in the Applicant's response to the first Office Action dated November 16, 2004, i.e. dynamic compensation for all three factors --- temperature coefficient of resistance of the thin film-heating material, temperature dependence of the components of the bridge, and temperature dependence of the physical property sensor -- is not taught by Davey at al col. 8, line 16 – col. 9, line 20. The Examiner has not provided sufficient evidence to the contrary. In fact, the Examiner has not specified which portions of col. 8, line 16 – col. 9, line 20 of Davey at al disclose all three features. The Applicants notes that the temperature dependence of the fluid property is not even mentioned by Davey et al. Again, the Examiner has instead merely cited portions of Davey et al. without a substantial explanation of how such cited sections and features of Davey et al disclose all of the limitations of Applicants' claim 1. The Applicants reminds the Examiner that the reference should not be taken out of context to in effect produced the words of the claims (and sometimes, not even the words or concepts of the claims), without their meaning or context.

Nevertheless in order further to distinguish the subject-matter of claim 1 from Davey et al., claim 1 has been amended and now provides the following language:

1. A temperature compensation method for a physical property sensor, said method comprising the steps of:

locating a bridge circuit on a physical property sensor substrate wherein said bridge circuit comprises a plurality of components, including at least one heating element and a plurality of resistors, including a plurality of compensating resistors

,wherein said plurality of compensating resistors includes a temperature independent resistor for compensating a temperature coefficient of resistance of said at least one heating element;

simultaneously driving an imbalance of said bridge circuit to a zero value and a supply voltage thereof to a level required to stabilize said heating element at a required temperature rise above an ambient temperature, wherein said heating element comprises a thin-film heating material,

adjusting the resistance value of said temperature independent resistor to compensate said temperature coefficient of resistance of said heating element(s); and

dynamically compensating for a temperature coefficient of resistance of said thin-film heating material and a temperature dependence of said plurality of resistors and said heating element(s) of said bridge circuit components and a temperature dependence of a physical property thereof, utilizing said plurality of compensating resistors of said bridge circuit.

In view of the Examiner's interpretation of element 100 shown in FIG. 3 of Davey et al. as being a compensating resistor, the scope of claim 1 has been limited reflect the fact that bridge circuit includes a plurality of compensating resistors that include a temperature independent resistor (for example shown as R_C of FIG. 2 of the application) for compensating the temperature coefficient of resistance of the heating element(s).

The Applicants submit that Davey et al. does not disclose a temperature compensation method utilizing a plurality of temperature compensating resistors as claimed in amended claim 1. Furthermore, there is no teaching or suggestion in

Davey et al. to use a temperature independent resistor as a compensating resistor and to adjust the resistance value of the temperature independent resistor to compensate for the temperature coefficient of resistance of the heating element(s). Utilizing the temperature independent resistor as a compensating resistor in this manner enables the non-linear effects of the temperature coefficient of resistance of the heating element(s) to compensated out for a specific fluid. Davey et al. does not teach compensating the temperature coefficient of resistance of the heating element(s) for a particular fluid, that is to say, compensation of the temperature coefficient of resistance of the heating elements as a function of the type of fluid is not possible.

Having regard to the foregoing, the Applicants respectfully submit that Davey et al. fails to disclose every element of claim as amended. The Applicants therefore submit that the rejection to claim 1 has been traversed. Accordingly, the Applicants respectfully request withdrawal of the rejection of claim 1.

Regarding independent claim 15, in order further to distinguish the claim from Davey et al., claim 15 has been limited to a temperature compensation system for a property sensor in which the bridge circuit includes a plurality of compensating resistors which plurality of compensating resistors include a temperature independent resistor for compensating the temperature coefficient of resistance of the heating element(s). For the reasons set forth above in relation to amended claim 1, the Applicants submit that there is no teaching or suggestion in Davey et al. to adopt a compensation resistor which is independent of temperature for compensating the temperature coefficient of resistance of the heating element(s).

Having regard to the foregoing, the Applicants respectfully submit that Davey et al. fails to disclose every element of claim 15 as amended. The Applicants

therefore submit that the rejection to claim 15 has been traversed. Accordingly, the Applicants respectfully request withdrawal of the rejection of claim 15.

Additionally, consequential amendments have been made to claims 4, 7, 17 in view of amended independent claims 1 and 15.

Since claims 2, 4, 7, 8, 10, 11, 16 and 18 were rejected in part as being dependent on claims 1 and 15, traversing the rejections of claims 1 and 15 therefore traverses the rejections of claims 2, 4, 7, 8, 10, 11, 16 and 18. Accordingly, the Applicants respectfully request withdrawal of the rejections to claims 2, 4, 7, 8, 10, 11, 16 and 18.

V. Claim Rejections Under 35 U.S.C. §103

Requirements for Prima Facie Obviousness

The obligation of the Examiner to go forward and produce reasoning and evidence in support of obviousness under 35 U.S.C. §103 is clearly defined at M.P.E.P. §2142:

> The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

M.P.E.P. §2143 sets out the three basic criteria that a patent examiner must satisfy to establish a *prima facie* case of obviousness necessary for establishing a rejection to a claim under 35 U.S.C. §103:

1. some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings;

2. a reasonable expectation of success; and

3. the teaching or suggestion of all the claim limitations by the prior art reference (or references when combined).

It follows that in the absence of such a *prima facie* showing of obviousness under 35 U.S.C. §103 by the examiner (assuming there are no objections or other grounds for rejection), an Applicant is entitled to grant of a patent. *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443 (Fed. Cir. 1992).

Thus, in order to support an obviousness rejection under 35 U.S.C. §103, the Examiner is obliged to produce evidence compelling a conclusion that each of the three aforementioned basic criteria has been met.

Davey et al. in view of Lee et al.

Claims 3 and 17 were rejected by the Examiner under 35 U.S.C. 103(a) as being unpatentable over Davey et al. in view of Lee et al. (US Patent No. 6,346,703).

The Examiner argued that Davey et al. teaches all the limitations of claim 1 upon which claim 3 depends and claim 15 upon which claim 17 depends. The Examiner admitted that Davey et al. does not teach one other compensating resistor, as shown in claims 3 and 17. The Examiner argued, however, that Lee et al. teaches three compensating resistors in a bridge circuit (citing col. 2, line 57 – col. 3, line 9 of Davey et al.). The Examiner argued that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the flow sensor, as taught by Davey et al., to include three compensating

resistors, as taught by Lee et al., because then resistance error would have been further reduced (citing Lee et al., col. 2, lines 21-col. 3, line 9).

The Applicants respectfully disagree with this assessment and reiterate the arguments related to this rejection as already set forth in the Applicant's response to the first Office Action dated November 16, 2004.

Nevertheless, amended claims 3 and 17 are now dependent on amended claim 1 and 15, respectively. For the reasons set forth above, amendments to claims 1 and 15 traverse rejections based on anticipation. Accordingly, the third prong of prima facie obviousness is clearly not met insofar as claims 3 and 17.

In any event, the Applicants have amended claims 3 and 17 to limit the claims to a bridge circuit having one other compensating resistor which is temperature independent (for example shown as R_{C1} of FIG. 2 of the application) and to reflect the fact that, for an adjusted resistance value of the temperature independent resistor, the resistance value of the other temperature independent resistor is adjusted such that the heating element is maintained at the required temperature above the ambient temperature.

Lee et al. discloses compensation sensor resistors 20, 30 and 40 which are temperature dependent not temperature independent (colmn. 4 lines 1-21 and FIG. 2. Lee et al. does not disclose or suggest adjusting a compensating resistor which is temperature independent for compensating the temperature coefficient of resistance of the heating element(s) or adjusting another compensating resistor which is temperature independent for maintaining the heating element at the required temperature above the ambient temperature.

Providing a bridge circuit, as claimed in amended claims 3 and 17, which includes one other compensating resistor which is temperature independent and

adjusted to maintain the heating element(s) at the originally required temperature above the ambient temperature in the manner claimed, enables the non-linear effects of the temperature coefficient of resistance and thermal conductivity of the heating elements to be compensated for each particular fluid without affecting the heating element(s) temperature above the ambient temperature.

The Applicants note that there is nothing in Davey et al. or Lee et al. to motivate one skilled in the art to design a device that includes all of the features taught by Applicants amended claims 3 and 17 and the specification thereof so that the first prong of the aforementioned prima facie obviousness test indicated above is not met

Having regard to the foregoing, the Applicants submit that the rejection to claims 3 and 17 has been traversed. The Applicant therefore respectfully requests that the rejection to claims 3 and 17 under 35 U.S.C. § 103 be withdrawn.

Davey et al. in view of Bonne et al.

Claims 5, 12, 14 and 19 were rejected by the Examiner under 35 U.S.C. 103(a) as being unpatentable over Davey et al. in view of Bonne et al. (US Patent No. 6,234,016).

The Examiner argued that Davey et al. teaches all the limitations of claim 1 upon which claims 5 and 12 depend and claim 15 upon which claim 19 depends. The Examiner admitted that Davey et al. does not teach the physical properties, as shown in claims 5 and 19, or a liquid property sensor, as shown in claim 12. The Examiner argued, however, that Bonne et al. teaches measuring specific heat and measuring fluid properties. In support of this argument, the Examiner cited col. 6, lines 16-18 of Davey et al. The Examiner argued that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the flow sensor, as taught by Davey et al., to include measuring specific heat and fluid properties, as taught by Boone et al., because then the sensor would have been functional for other measurements. The Examiner argued that claim 14 contains limitations similar to those in claims 1, 4, 5, 7 and 8 and rejected claim 14 on the same grounds.

Applicants respectfully disagree with this assessment and reiterate the arguments relating to this rejection as already set forth in the Applicant's response to the first Office Action dated November 16, 2004.

The Applicants note, for example, that Applicants' claim 5 teaches that the physical property value comprises a value of at least one of the following: thermal conductivity, specific heat, compressibility, octane number, heating value, speed of sound, and viscosity. Boone et al. does not teach one or more of all of the following: thermal conductivity, specific heat, compressibility, octane number, heating value, speed of sound, and viscosity. Col. 6, lines 16-18 of Davey et al.

makes no mention, for example, of octane number or the speed of sound. A similar argument applies to the rejection to claim 14.

Nevertheless, claims 5, 12 and 19 are now dependent on amended claims 1 and 15. For the reasons set forth above, amendments to claims 1 and 15 traverse rejections based on anticipation. Accordingly, the third prong of prima facie obviousness is clearly not met insofar as claims 5, 12 and 19. Furthermore, there is nothing in Davey et al. or Bonne et al. to motivate the skilled person to adopt a compensating resistor which is temperature independent for compensating the temperature coefficient of resistance of the heating element(s).

With regard to claim 14, the claim has been amended to restrict the claim to a temperature compensation method in which the bridge circuit has a plurality of compensating resistors, including a first temperature independent resistor for compensating a temperature dependence of a physical property value and a second temperature independent resistor for maintaining the heating element at the required temperature above ambient for the increased resistance value of the first temperature independent resistor. There is nothing disclosed in Davey et al. or Bonne et al. which teaches or suggests adjusting the resistance value of a second temperature independent resistor such that the heating element is maintained at the required temperature rise above the ambient temperature for the increased resistance value of the first temperature independent resistor. As already mentioned above in relation to claims 3 and 17, using a second independent temperature resistor which is adjusted such that the heating element is maintained at the required temperature rise above the ambient temperature for the increased resistance value of the first temperature independent resistor, enables both the temperature coefficient of resistance and the thermal conductivity of the heating element to be compensated for each specific fluid.

Based on the foregoing, the Applicants submit that the rejection to claims 5, 12, 14 and 19 has been traversed. The Applicant therefore respectfully requests that the rejection to claims 5, 12, 14 and 19 under 35 U.S.C. § 103 be withdrawn.

Davey et al. in view of Bonne et al.

Claim 13 was rejected by the Examiner under 35 U.S.C. 103(a) as being unpatentable over Davey et al. in view of Bonne (US Patent No. 5,237,523)

The Examiner argued that Davey et al. teaches all the limitations of claim 1 upon which claim 13 depends. The Examiner admitted that Davey et al. does not teach a solid property sensor, as shown in claim 13. The Examiner argued, however, that Davey et al. teaches a solid property sensor (col. 5, lines 24-35). The Examiner therefore argued that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the flow sensor, as taught by Davey et al., to include a solid property sensor, as taught by Bonne, because then the sensor would have been functional for other measurements.

Applicants respectfully disagree with this assessment and reiterate the arguments relevant to the rejection of claim 13 as already set forth in the Applicant's response to the first Office Action dated November 16, 2004.

It is important to note that col. 5, lines 24-35 of Bonne et al. does not teach a solid property sensor, but instead teaches at col. 5, line 33 that "...solid substances of the sensor may be considered." In other words, solid substances associated with the sensor are considered, not solid properties associated with the substance under detection.

Nevertheless, claim 13 is now dependent on amended claim 1. For the reasons set forth above, amendments to claim 1 traverse rejections based on anticipation.

Based on the foregoing, the Applicants submit that the rejection to claim 13 has been traversed. The Applicants therefore respectfully request that the rejection to claim 13 under 35 U.S.C. § 103 be withdrawn.

VI Conclusion

In view of the foregoing discussion, the Applicants have responded to each and every rejection of the Official Action. The Applicants have clarified the structural distinctions of the present invention by amendments herein.

A new claim dependent on claim 17 has been added so as to provide adequate protection for important features of the invention.

Also an amendment has been made to paragraph 12 of the specification to conform the description to the amended claims.

The foregoing discussion and amendments do not present new issues for consideration and no new search is necessitated. Such amendments are supported by the specification and do not constitute new matter. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejections and further examination of the present application.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned representative to conduct an Interview in an effort to expedite prosecution in connection with the present application.

Respectfully submitted,

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